California FORESTRY Note

State of California
The Resources Agency
Department of Forestry

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NO. 85 APRIL, 1983

CONTROL OF WESTERN BRACKEN FERN WITH ASULAM HERBICIDE ON MOUNTAIN HOME DEMONSTRATION STATE FOREST

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Western bracken fern, (Pteridium aquilinum var. pubescens), is a common herbaceous plant occurring throughout the western United States and is widely distributed in California (Munz 1973). It is a serious competitor to forest regeneration on many sites throughout the state. Bracken fern is known to have a growth inhibiting effect on other plants and is poisonous to animals, especially cattle (Stewart 1975, Radosevich 1978). Eradication of this pest by controlled fire, or mechanical means has largely been unsuccessful because of the plant's ability to regenerate from underground rhizomes. Several herbicides have shown promise for control of bracken fern including: dicamba, glyphosate, bromacil, picloram, and asulam (Stewart 1976, Radosevich 1978, Lawson 1965). Tests conducted in Oregon and California have found asulam to be highly selective in bracken fern control and to have the potential for use as a release spray in existing conifer plantations (Stewart 1976, Radosevich 1980, Stewart 1979). To test the effectiveness of asulam for selective bracken fern control in the southern Sierra Nevada Mountains, test plots were established on the Mountain Home Demonstration State Forest, Tulare County, during 1978.

The Study

Three concentrations of asulam were sprayed on 0.25 or 0.5 acre plots on August 24th and 25th, 1978. All plots had a heavy cover of bracken fern in full frond at the time of application. Other major plant species existing on the plots were thick-leaved lotus (Lotus crassifolius), lupine (Lupinus spp.), California hazelnut (Corylus cornuta var. californica), gooseberry (Ribes roezlii), Sierra currant (Ribes nevadense), Sierra redwood (Sequoiadendron giganteum), white fir (Abies concolor), ponderosa pine (Pinus ponderosa), sugar pine (Pinus lambertiana), and incense-cedar (Libocedrus decurrens).

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The herbicide was applied over the entire plot area with ground spray equipment. The herbicide was applied at the rates of 1, 2, and 3 pounds of active ingredient (AI) per acre with a water carrier volume equivalent to 140 gallons per acre. The percent of bracken fern cover reduction was determined by ocular estimation. The results are displayed in Table 1.

Table 1. Percent reduction of bracken fern cover sprayed with asulam, two years after treatment by rate of application.

Rate of Application	Percent Reduction of Bracken Fern Cover Two Years After Spraying
1 lb. AI/acre	75%
2 lb. AI/acre	80%
3 lb. AI/acre	90%
Control	0%

No harmful effect on any of the other vegetation, including tree seedlings, could be seen. In fact, the other herbaceous plants, especially lotus and lupine, appeared to increase in density after being released from the bracken fern competition.

In addition to the plot treatment, 33 individual tree seedlings and saplings were sprayed with asulam on an adjacent site. The tree species sprayed were: ponderosa pine, white fir, red fir, sugar pine, incense-cedar, and Sierra redwood. Spraying was conducted in September after cessation of new growth. The trees were sprayed to the drip point with a mixture equivalent to a 3 lb. AI/acre rate. Of the 33 trees sprayed, 6 were killed by browsing and 3 were killed by white pine blister rust (Cronartium ribicola). The 24 remaining trees were observed and monitored for two years following treatment. The trees ranged from 0.3 to 12.3 feet in height with an average height of 4.2 feet; and approximate ages ranged from 3 to 15 years with an average age of 17 years at the time of spraying. No adverse effects or reduction in height growth was observed with any of the species.

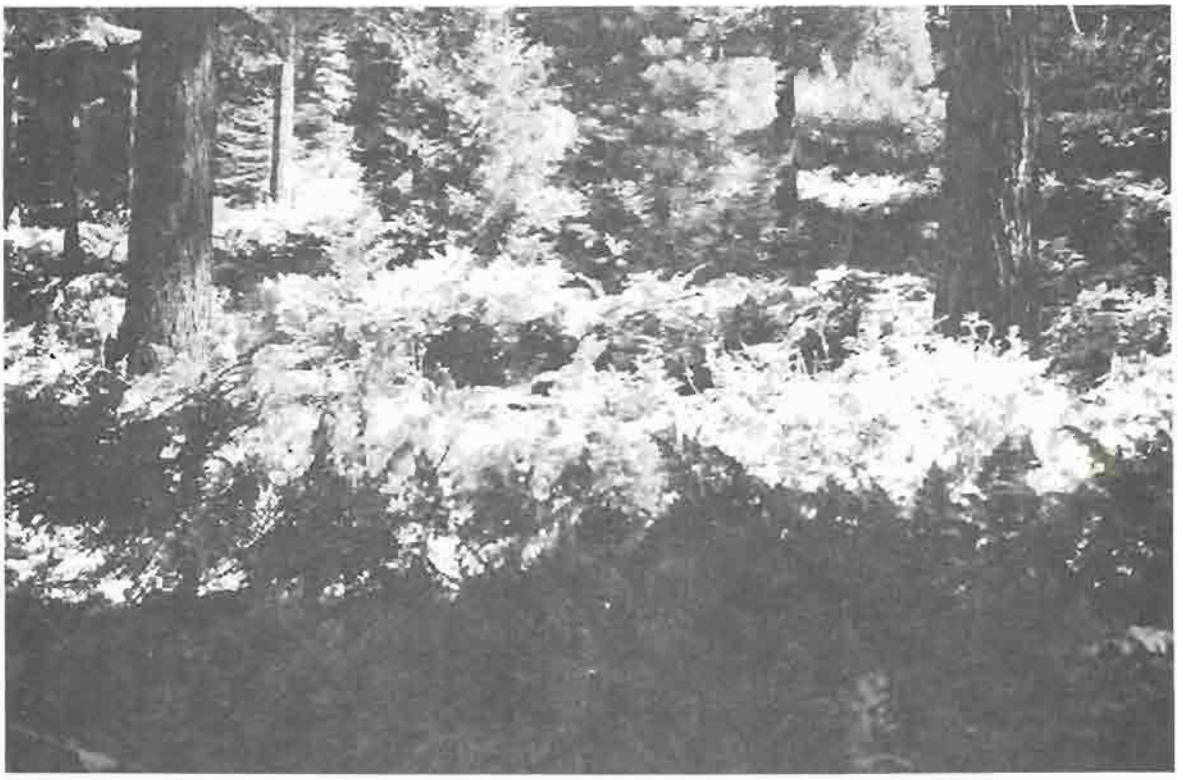

Figure 1. Bracken fern cover before spraying with 2 pounds Asulam/acre.

Figure 2. Same area as Figure 1, one year after treatment with 2 pounds Asulam/acre.

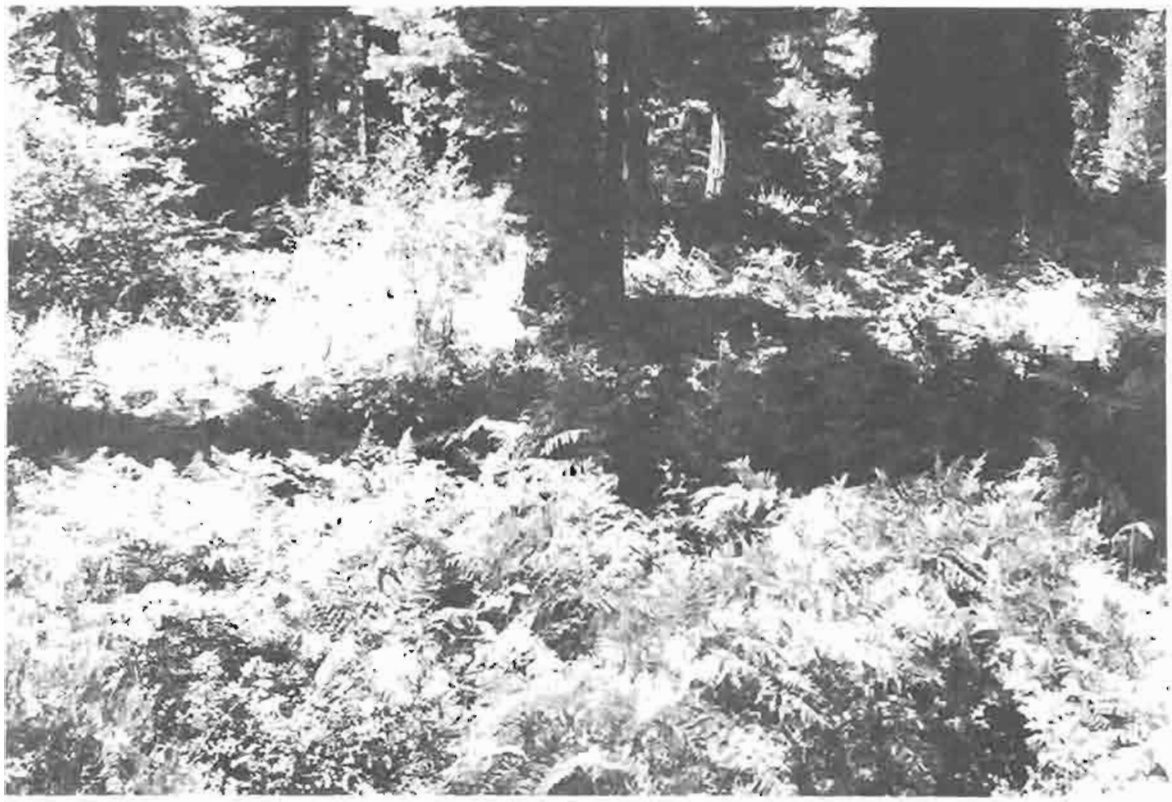

Figure 3. Bracken fern cover before spraying with 1 pound Asulam/acre.

Figure 4. Same area as Figure 3, one year after treatment with 1 pound Asulam/acre.

Conclusions

Asulam appears to be a very effective and selective herbicide for the control of bracken fern. The herbicide did not adversely affect tree seedlings, saplings, or other vegetation when applied at the indicated rates in late summer. Bracken fern cover was substantially reduced with all of the application rates tested. Rates as low as 1 lb. AI/acre provided for enough cover reduction to be effective as a release spray where conifer seedlings already exist. The higher rates, up to 3 lb. AI/acre, may be appropriate for site preparation before tree planting because of the more complete bracken fern reduction.

Because of the very selective nature of asulam, treatments are most successful where bracken fern is the major competing species on the site. Effectiveness of treatments may be reduced by the subsequent release of other competing plant species where they occur in association with bracken fern.

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PESTICIDE PRECAUTIONARY STATEMENT

This publication reports research involving pesticides. It does not imply that the uses discussed here have been registered. All uses of pesticides must be registered by appropriate State and/or Federal agencies before they can be recommended.

CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife--if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow the directions and heed all precautions on the labels. Follow recommended practices for disposal of surplus pesticides and pesticide containers.

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